

UNITED STATES NAVAL OBSERVATORY
CIRCULAR NO. 76

U. S. Naval Observatory, Washington 25, D. C.

June 5, 1957

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS
DECEMBER, 1956

By Winifred Sawtell Cameton

These results are based upon measurements made at the Naval Observatory on plates secured either there or at the Mt. Wilson Observatory. The symbols used for the entries in the successive columns are as follows:

U.T., the epoch of observation in Universal Time.

No., the identifying number of the group assigned by Mt. Wilson.

Δl , the heliographic difference in longitude from the central meridian, measured positive to the west.

φ , the heliographic latitude, measured positive to the north.

ρ , the heliocentric angular distance from the line joining the centers of the Earth and Sun.

A , the true area of the umbra plus penumbra, expressed in millionths of the visible hemisphere.

s , the number of spots.

An asterisk means that no Mt. Wilson number was assigned. Plates secured at the Naval Observatory are indicated by N, and those at Mt. Wilson by M. The plate quality, which follows, is indicated by:

1, Poor; 2, Fair; 3, Good; 4, Very Good; 5, Excellent.

The following five quantities are listed successively at the end of each day, and give for that day:

1. The total number of groups, g .
2. The longitude of the central meridian, L_0 .
3. The latitude of the center of the disc, B_0 .
4. The total value of A .
5. The total value of s .

The mean daily area and the mean relative sunspot number, $r=10g+s$ are given at the end of the month.

These results are a continuation of those published in the *Monthly Weather Review* from February 1, 1927 to December 31, 1947.

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U.T.	No.	Δl	φ	ρ	A	s	U.T.	No.	Δl	φ	ρ	A	s
1.687 N-2	12003	-87	-25	87	485	1	11988	+6	+24	24	12	3	
	11996	-54	-19	56	121	1	11988	+8	+26	26	12	3	
	11996	-53	-16	55	73	1	11988	+9	+26	26	6	1	
	11990	-34	-13	36	48	1	11988	+9	+24	24	291	4	
	11990	-32	-14	35	16	1	11988	+11	+26	27	12	1	
	11990	-31	-14	34	16	1	11988	+13	+25	26	32	4	
	11990	-27	-13	31	170	2	11988	+14	+24	27	32	4	
	11990	-24	-14	28	24	1	11988	+18	+22	27	32	1	
	11990	-24	-12	27	32	2	11988	+20	+21	27	12	2	
	11991	-34	-26	43	73	1	11988	+22	+22	29	61	1	
	11993	-33	+25	39	97	2	11985	+16	-16	24	12	1	
	11993	-29	+24	36	36	1	11985	+17	-15	24	16	3	
	11993	-25	+24	33	242	2	11985	+17	-16	25	6	1	
	12001	-10	+21	22	16	1	11985	+19	-15	26	6	1	
	12001	-8	+21	21	24	1	11985	+19	-14	25	6	1	
	11988	-3	+23	22	388	3	11985	+20	-14	26	12	1	
	11988	-1	+25	24	32	1	11985	+21	-13	25	6	1	
	11988	0	+23	22	61	2	11999	+17	+15	22	16	3	
	11988	+1	+23	22	97	3	12000	+32	+29	41	12	1	
	11988	+3	+20	18	48	2	11997	+32	+19	36	6	1	
	11988	+5	+21	19	97	2	11997	+34	+20	38	12	1	
	11988	+6	+20	19	36	2	11997	+36	+17	39	12	1	
	11988	+7	+21	21	73	1	11981	+60	+17	61	12	1	
	11999	+6	+15	15	36	2							
	11999	+7	+15	16	12	1							
	11999	+8	+15	16	24	2							
	11985	+6	-15	17	32	1							
	12000	+14	+31	33	61	2							
	12000	+16	+29	33	48	1							
	11997	+20	+19	26	32	2							
	11981	+55	+14	56	16	2							
	(12)	(334)	(+1)		2566	48							
2.673 M-2	12006	-87	-15	87	145	1	11988	+6	+24	24	12	3	
	12005	-77	+28	78	48	1	11988	+8	+26	26	12	3	
	12005	-68	+28	70	24	2	11988	+9	+26	26	6	1	
	12005	-63	+28	66	36	2	11988	+9	+24	24	291	4	
	12003	-70	-24	74	242	1	11988	+11	+26	27	12	1	
	12002	-65	+24	66	24	1	11988	+13	+25	26	32	4	
	11996	-41	-16	44	16	3	11988	+14	+24	27	32	4	
	11996	-41	-18	44	24	1	11988	+18	+22	27	32	1	
	11996	-39	-15	42	16	4	11988	+20	+21	27	12	2	
	11996	-37	-16	41	16	3	11988	+22	+22	29	61	1	
	11991	-19	-25	33	36	3	11985	+16	-16	24	12	1	
	11993	-18	+26	31	36	4	11985	+17	-15	24	16	3	
	11993	-16	+24	27	32	1	11985	+17	-16	25	6	1	
	11993	-15	+26	28	16	3	11985	+19	-15	26	6	1	
	11993	-14	+26	28	24	4	11985	+19	-14	25	6	1	
	11993	-11	+25	25	158	5	11985	+20	-14	26	12	1	
	11990	-14	-13	19	48	3	11985	+21	-13	25	6	1	
	11990	-12	-11	16	16	3	11999	+17	+15	22	16	3	
	12004	-8	-1	9	6	1	12000	+32	+29	41	12	1	
	11989	-4	+18	17	6	1	11997	+32	+19	36	6	1	
	12001	+3	+22	20	6	1	11997	+34	+20	38	12	1	
	12001	+4	+21	19	12	2	11997	+36	+17	39	12	1	
							11981	+60	+17	61	12	1	
							(17)	(321)	(+1)		1623	91	
3.651 N-2	12009	-82	-20	82	727	1	12009	-82	-20	82	727	1	
	12006	-80	-16	80	194	1	12006	-80	-16	80	194	1	
	12006	-70	-16	71	291	1	12006	-70	-16	71	291	1	
	12008	-80	-24	80	194	1	12008	-80	-24	80	194	1	
	12003	-68	-25	71	36	1	12003	-68	-25	71	36	1	
	12003	-58	-26	62	412	1	12003	-58	-26	62	412	1	
	12007	-58	+35	63	16	2	12007	-58	+35	63	16	2	
	12005	-56	+27	60	12	1	12005	-56	+27	60	12	1	
	12005	-51	+27	56	24	1	12005	-51	+27	56	24	1	
	12002	-52	+23	55	24	1	12002	-52	+23	55	24	1	
	11996	-28	-16	33	48	1	11996	-28	-16	33	48	1	
	11996	-27	-18	33	32	2	11996	-27	-18	33	32	2	
	11996	-27	-17	33	32	1	11996	-27	-17	33	32	1	
	11996	-25	-16	31	36	1	11996	-25	-16	31	36	1	
	11996	-24	-16	29	36	1	11996	-24	-16	29	36	1	
	11991	-7	-26	27	32	1	11991	-7	-26	27	32	1	
	11993	-6	+26	26	36	1	11993	-6	+26	26	36	1	
3.651 N-2	11993	-5	+24	24	24	2	11993	-5	+24	24	24	2	
	11993	-5	+25	25	61	1	11993	-5	+25	25	61	1	
	11993	-4	+24	24	32	1	11993	-4	+24	24	32	1	
	11993	-2	+25	25	36	2	11993	-2	+25	25	36	2	
	11993	+1	+25	25	206	3	11993	+1	+25	25	206	3	
	11990	-1	-13	13	36	2	11990	-1	-13	13	36	2	
	11990	+1	-11	11	12	1	11990	+1	-11	11	12	1	
	11988	+23	+25	33	12	1	11988	+23	+25	33	12	1	
	11988	+24	+24	34	412	2	11988	+24	+24	34	412	2	
	11988	+25	+25	35	24	2	11988	+25	+25	35	24	2	
3.651 N-2	11988	+26	+24	35	133	4	11988	+26	+24	35	133	4	
	11988	+34	+21	39	36	2	11988	+34	+21	39	36	2	
	11988	+35	+22	40	48	1	11988	+35	+22	40	48	1	

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U.T.	No.	Δl	φ	ρ	A	s	U.T.	No.	Δl	φ	ρ	A	s
		$^{\circ}$	$^{\circ}$	$^{\circ}$					$^{\circ}$	$^{\circ}$	$^{\circ}$		
	11985	+32	-16	36	48	3		12009	-57	-21	61	630	1
	11985	+35	-16	38	145	3		12011	-69	-23	71	145	1
	11997	+45	+20	49	97	1		12006	-57	-18	60	48	1
	11997	+46	+21	50	158	2		12006	-55	-17	57	339	2
	11997	+48	+20	52	24	1		12006	-51	-19	54	121	2
	11981	+80	+15	80	194	1		12006	-46	-17	49	242	3
	(15)	(309)	(0)		3920	54		12008	-56	-24	60	97	2
4,586	12009	-85	-18	85	242	2		12008	-54	-25	58	97	1
N-3	12009	-75	-20	77	679	3		12003	-45	-25	50	24	1
	12009	-70	-20	72	824	2		12003	-34	-26	42	436	1
	12011	-80	-22	80	145	1		12005	-32	+26	40	109	2
	12008	-69	-23	71	61	2		12005	-26	+25	35	36	2
	12008	-66	-24	69	145	1		11996	-5	-21	22	24	1
	12006	-68	-16	70	194	2		11996	-5	-19	20	24	1
	12006	-68	-17	70	48	2		11996	-4	-19	20	48	2
	12006	-65	-16	67	12	3		11996	-2	-18	18	97	2
	12006	-64	-18	65	73	1		11996	+1	-18	18	36	1
	12006	-60	-18	63	48	2		11996	+3	-18	18	61	1
	12006	-58	-16	61	279	1		11993	+15	+21	26	36	1
	12006	-56	-18	59	24	2		11993	+21	+23	31	291	1
	12003	-57	-25	61	24	1		11988	+43	+21	47	388	2
	12003	-46	-26	52	339	1		11988	+46	+20	49	121	1
	12007	-44	+34	54	16	1		11988	+47	+20	51	121	2
	12005	-43	+26	48	61	3		11985	+58	-17	61	73	1
	12005	-40	+26	46	32	1		(10)	(284)	(0)		4420	37
	12005	-39	+25	46	48	3	6,590	12009	-57	-17	59	170	1
	11996	-16	-18	24	6	1	N-3	12009	-55	-17	57	73	1
	11996	-15	-19	26	97	6		12009	-51	-18	54	32	1
	11996	-14	-17	23	145	7		12009	-48	-21	52	630	2
	11996	-10	-17	21	48	3		12009	-43	-21	47	679	1
	11993	+5	+23	24	12	1		12011	-57	-24	61	36	1
	11993	+5	+22	23	36	3		12011	-54	-23	58	97	4
	11993	+6	+22	23	24	1		12011	-53	-23	56	121	1
	11993	+7	+24	25	16	1		12008	-43	-23	48	36	1
	11993	+8	+24	25	16	2		12008	-42	-24	47	73	3
	11993	+12	+24	27	194	2		12008	-40	-24	46	73	1
	11990	+6	-16	17	6	1		12008	-36	-25	44	24	2
	11990	+12	-15	19	16	1		12006	-41	-15	43	61	1
	11990	+13	-14	19	6	1		12006	-40	-16	43	485	5
	11990	+14	-14	20	6	1		12006	-36	-18	40	97	2
	12010	+28	+28	39	6	1		12006	-35	-17	39	61	1
	12010	+30	+28	41	6	1		12006	-32	-17	36	73	1
	11988	+33	+22	39	364	5		12006	-31	-17	36	121	2
	11988	+35	+22	41	97	5		12006	-31	-19	36	48	1
	11988	+38	+22	43	48	2		12003	-30	-25	38	6	1
	11988	+39	+21	44	109	6		12003	-20	-26	34	339	1
	11988	+46	+20	49	32	3		12005	-17	+27	33	194	4
	11985	+47	-16	49	97	2		12005	-17	+26	31	24	1
	11997	+57	+19	60	170	3		12005	-15	+27	32	145	6
	(14)	(296)	(0)		4851	93		12005	-13	+26	29	48	3
5,538	12009	-73	-18	74	291	1		12005	-11	+26	28	24	1
N-1	12009	-64	-21	65	485	1		12002	-16	+22	27	16	1
								12002	-15	+20	25	16	1
								12002	-14	+21	25	6	1

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U. T.	No.	Δl	φ	ρ	A	s	U. T.	No.	Δl	φ	ρ	A	s
		$^{\circ}$	$^{\circ}$	$^{\circ}$					$^{\circ}$	$^{\circ}$	$^{\circ}$		
	11996	+11	-18	22	61	4		12009	-22	-21	29	485	2
	11996	+16	-17	24	61	3		12009	-16	-20	26	582	2
	11996	+17	-17	25	48	1		12011	-30	-22	36	16	1
	11996	+19	-15	25	36	1		12011	-26	-22	34	16	2
	11996	+19	-16	26	32	1		12011	-25	-23	34	194	2
	11993	+37	+24	44	206	1		12008	-20	-24	31	12	1
	11988	+60	+22	63	679	3		12008	-17	-22	28	6	2
	11988	+67	+21	69	339	2		12008	-14	-23	27	12	2
	11985	+75	-16	76	97	1		12008	-13	-24	27	12	1
	(11)	(270)	(0)		5367	69		12015	-14	-28	32	6	1
7,587	12009	-44	-17	47	170	1		12006	-14	-15	20	16	1
N-2	12009	-41	-17	44	48	2		12006	-14	-17	23	436	11
	12009	-36	-18	40	24	1		12006	-11	-17	21	32	2
	12009	-35	-21	40	582	3		12006	-8	-18	21	61	3
	12009	-29	-21	36	582	1		12006	-7	-16	17	16	1
	12011	-39	-23	45	73	2		12006	-5	-17	18	32	2
	12011	-38	-23	44	121	1		12006	-3	-17	17	12	1
	12006	-26	-17	32	485	9		12006	-2	-18	18	16	2
	12006	-26	-15	30	24	1		12003	+5	-27	28	16	2
	12006	-22	-18	28	73	1		12003	+7	-26	27	339	1
	12006	-21	-16	26	61	1		12005	+8	+26	27	170	5
	12006	-20	-18	27	16	1		12005	+10	+27	29	48	1
	12006	-17	-17	25	97	1		12005	+10	+26	28	121	3
	12006	-16	-17	24	32	1		12005	+10	+24	26	32	2
	12006	-15	-19	25	24	4		12005	+11	+24	26	16	1
	12006	-15	-17	23	32	1		12005	+13	+26	29	339	5
	12008	-27	-23	35	32	2		12005	+15	+26	30	85	1
	12008	-26	-23	35	48	1		11996	+40	-18	44	16	2
	12008	-22	-24	33	24	1		11996	+44	-17	46	32	2
	12003	-8	-26	27	24	1		11996	+45	-16	47	24	1
	12003	-6	-26	27	388	1		11993	+64	+25	66	194	2
	12005	-5	+26	26	97	5		(13)	(243)	(0)		3689	77
	12005	-4	+27	27	85	2	9,742	12017	-56	+28	60	24	2
	12005	-3	+28	28	48	2	M-2	12017	-52	+27	56	24	1
	12005	-2	+26	26	97	3		12017	-51	+28	56	36	2
	12005	0	+25	25	121	2		12016	-54	-27	58	61	2
	12005	0	+27	27	97	1		12016	-52	-28	57	16	1
	12005	+2	+26	26	97	2		12016	-50	-26	54	291	7
	12005	+4	+27	27	24	1		12016	-49	-24	54	24	1
	12002	-2	+21	21	16	1		12016	-49	-26	54	48	1
	11996	+25	-18	31	61	2		12016	-47	-24	52	48	1
	11996	+32	-17	36	32	2		12016	-46	-25	51	48	2
	11993	+50	+24	54	267	1		12016	-46	-26	51	73	1
	11988	+74	+22	75	582	1		12016	-44	-23	48	291	5
	(10)	(257)	(0)		4584	62		12014	-45	-12	47	16	1
8,588	12017	-70	+26	73	12	2		12014	-35	-11	36	24	1
N-3	12016	-64	-26	67	12	2		12018	-21	+27	34	16	1
	12014	-51	-13	53	12	1		12018	-21	+29	35	16	1
	12013	-31	-13	34	16	1		12013	-16	-11	19	12	1
	12013	-28	-11	31	12	1		12009	-16	-16	23	145	2
	12009	-31	-17	35	170	1		12009	-13	-19	24	24	1
	12009	-27	-19	34	61	2		12009	-11	-19	23	24	2
								12009	-8	-18	21	24	3
								12009	-6	-21	22	339	3

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U.T.	No.	Δl	φ	ρ	A	s	U.T.	No.	Δl	φ	ρ	A	s	
	12009	-2	-20	20	630	2		12006	+18	-18	26	48	2	
	12011	-16	-22	26	61	2		12003	+33	-25	40	436	2	
	12011	-16	-23	28	16	1		12005	+35	+28	44	242	3	
	12011	-12	-20	24	24	3		12005	+39	+28	47	291	1	
	12011	-11	-22	24	145	2		12005	+39	+26	46	97	1	
	12011	-9	-22	24	12	2		12002	+36	+21	41	97	2	
	12008	-4	-23	24	16	2		12002	+40	+23	45	85	2	
	12006	0	-15	15	16	1		11996	+66	-19	67	32	1	
	12006	0	-16	16	194	3		11996	+66	-18	67	32	1	
	12006	0	-18	18	242	4			(11)	(217)	(0)	4997	64	
	12006	+2	-16	16	16	2								
	12006	+4	-17	17	48	4								
	12006	+5	-18	19	32	1		11.700	12016	-25	-27	36	194	2
	12006	+6	-17	18	24	1	N-1	12016	-24	-24	34	97	2	
	12006	+10	-16	19	12	2		12016	-23	-25	33	145	1	
	12006	+11	-18	22	73	4		12016	-21	-24	30	97	1	
	12005	+17	+28	33	24	1		12016	-20	-26	32	121	2	
	12005	+19	+29	35	24	2		12016	-18	-23	28	48	2	
	12005	+23	+27	35	24	3		12016	-16	-24	28	24	1	
	12005	+26	+27	37	533	4		12016	-15	-23	26	97	2	
	12003	+20	-26	33	315	1		12017	-24	+26	35	48	1	
	12002	+26	+21	33	16	1		12009	+11	-17	19	73	1	
	11996	+54	-19	56	61	2		12009	+21	-21	27	339	2	
	11996	+58	-19	60	73	2		12009	+25	-20	31	436	2	
	11996	+59	-16	61	61	1		12013	+13	-10	15	48	1	
	11995	+77	+25	78	339	1		12013	+14	-12	17	24	1	
	(14)	(228)	(0)		4655	96		12013	+16	-12	19	121	1	
								12011	+16	-23	26	145	3	
10,590	12017	-45	+27	51	48	1		12006	+26	-17	30	73	1	
N-2	12017	-42	+27	49	48	1		12006	+27	-18	32	291	2	
	12017	-40	+27	47	36	1		12005	+44	+29	52	48	1	
	12016	-42	-27	49	32	1		12005	+50	+29	57	145	1	
	12016	-39	-28	47	291	2		12003	+48	-26	53	194	1	
	12016	-38	-26	45	291	4		12002	+56	+24	60	97	1	
	12016	-36	-24	43	73	2			(9)	(202)	(-1)	2905	32	
	12016	-35	-27	44	97	3								
	12016	-34	-24	41	194	3		12,641	12023	-63	-16	64	61	1
	12016	-32	-25	39	48	1	N-2	12022	-36	-26	43	16	1	
	12016	-31	-23	37	73	2		12022	-32	-25	38	16	1	
	12018	-12	+26	29	24	1		12016	-14	-28	31	279	2	
	12009	-4	-16	17	145	1		12016	-14	-27	30	85	4	
	12009	+1	-16	16	36	1		12016	-13	-26	28	73	2	
	12009	+5	-21	22	533	6		12016	-10	-28	29	170	4	
	12009	+10	-19	23	679	1		12016	-9	-26	27	97	1	
	12009	+12	-22	26	36	1		12016	-8	-25	25	170	2	
	12013	-3	-11	12	32	1		12016	-6	-24	24	36	1	
	12013	-2	-10	10	61	2		12016	-5	-25	25	170	5	
	12011	-1	-21	21	48	2		12016	-4	-24	24	170	2	
	12011	0	-20	20	73	2		12016	-4	-22	20	24	1	
	12011	+1	-22	22	145	1		12016	-3	-23	21	32	1	
	12006	+11	-17	21	97	2		12016	-1	-24	23	97	2	
	12006	+13	-18	23	242	2		12016	0	-20	18	32	2	
	12006	+13	-16	22	158	3		12014	+6	-11	12	24	1	
	12006	+15	-18	24	36	1		12009	+24	-17	28	97	1	
	12006	+16	-17	24	61	1		12009	+27	-20	33	36		

U. T.	No.	ΔI	φ	ρ	A	s
	12006	+55	-17	57	12	2
	12006	+56	-16	56	6	1
	12006	+61	-16	62	36	1
	12003	+74	-25	75	339	1
	12002	+76	+27	78	170	1
	12005	+82	+23	82	48	2
	(14)	(176)	(-1)		3819	96
14.678	12031	-85	-25	85	145	1
M-5	12030	-79	+14	79	339	3
	12025	-46	-22	49	6	1
	12025	-43	-21	46	6	1
	12023	-35	-16	37	16	1
	12029	-35	-28	44	6	2
	12029	-34	-28	43	24	3
	12017	+ 8	+28	31	32	7
	12017	+ 8	+29	32	36	1
	12017	+11	+29	33	6	2
	12017	+11	+27	31	6	3
	12017	+14	+26	31	61	9
	12017	+16	+26	31	36	11
	12016	+ 8	-30	34	12	2
	12016	+ 9	-29	35	194	3
	12016	+10	-26	32	121	10
	12016	+13	-29	32	48	1
	12016	+13	-27	30	16	1
	12016	+14	-28	31	48	6
	12016	+15	-26	29	85	3
	12016	+16	-26	30	16	3
	12016	+16	-25	28	48	2
	12016	+17	-25	29	36	4
	12016	+19	-26	31	12	2
	12016	+19	-24	29	61	2
	12016	+19	-25	30	24	10
	12016	+21	-26	32	6	2
	12016	+21	-25	31	12	2
	12016	+21	-24	30	16	1
	12016	+22	-24	31	6	1
	12016	+22	-25	32	16	4
	12016	+23	-25	33	16	7
	12016	+25	-24	34	121	10
	12028	+25	+24	35	16	4
	12028	+26	+22	34	16	2
	12028	+27	+22	35	16	3
	12014	+30	-13	32	12	4
	12014	+34	-12	35	16	5
	12024	+35	-23	39	12	1
	12009	+47	-18	49	61	1
	12009	+56	-21	58	48	2
	12009	+58	-22	60	242	3
	12009	+63	-21	64	388	1
	12013	+47	-13	48	6	1
	12013	+48	-12	49	6	2
	12013	+49	-11	49	6	3
	12013	+51	-13	52	12	3

DECEMBER

U. T.	No.	Δl	φ	ρ	A	s	U. T.	No.	Δl	φ	ρ	A	s
		$^{\circ}$	$^{\circ}$	$^{\circ}$					$^{\circ}$	$^{\circ}$	$^{\circ}$		
	12013	+52	-14	53	12	2		12009	+63	-19	64	73	1
	12013	+55	-15	56	48	5		12009	+74	-23	75	218	1
	12013	+57	-16	58	121	6		12009	+79	-21	79	436	1
	12011	+54	-24	57	145	2		12013	+65	-13	65	16	1
	12006	+65	-20	66	242	3		12013	+67	-14	67	24	1
	12006	+66	-18	67	12	3		12013	+68	-15	68	24	3
	12006	+69	-16	69	6	3		12013	+70	-15	70	24	1
	12006	+72	-16	72	36	5		12013	+72	-14	72	48	3
	12003	+88	-25	88	485	1		12013	+75	-16	75	48	3
	(15)	(163)	(-1)		3597	188		12011	+69	-24	71	170	2
								12006	+81	-19	81	194	1
15.744	12030	-76	+15	77	291	2		(14)	(149)	(-1)		4358	126
M-3	12030	-76	+14	77	48	2							
	12030	-73	+15	75	73	2	16.756	12033	-78	+36	80	73	1
	12030	-69	+15	71	24	1	N-1	12030	-66	+18	67	36	1
	12030	-66	+14	69	582	6		12030	-63	+16	65	436	2
	12030	-65	+13	66	32	1		12030	-61	+14	63	48	1
	12031	-74	-24	75	32	1		12030	-60	+15	63	315	1
	12031	-71	-26	73	291	1		12030	-55	+13	56	170	3
	12031	-68	-23	70	16	1		12030	-55	+15	57	388	3
	12025	-40	-24	45	12	1		12030	-52	+14	54	242	4
	12025	-36	-25	43	12	1		12031	-61	-23	63	97	1
	12029	-21	-27	34	16	1		12031	-59	-25	62	242	1
	12029	-21	-28	34	12	2		12023	- 9	-19	21	24	2
	12029	-19	-28	34	24	2		12023	- 7	-16	16	24	1
	12023	-20	-16	25	16	1		12032	+12	+21	24	48	1
	12017	+22	+30	37	73	2		12017	+35	+30	46	97	3
	12017	+23	+28	36	12	1		12017	+36	+28	46	109	1
	12017	+24	+27	36	16	3		12017	+38	+27	46	48	2
	12017	+26	+28	38	12	1		12017	+45	+26	52	194	3
	12017	+26	+26	36	24	3		12016	+37	-30	46	73	1
	12017	+27	+28	39	16	2		12016	+37	-28	46	170	2
	12017	+29	+26	39	16	1		12016	+37	-27	45	73	1
	12017	+30	+27	41	121	7		12016	+40	-29	48	194	2
	12016	+23	-29	36	145	1		12016	+43	-27	49	73	1
	12016	+24	-27	35	73	8		12016	+44	-29	51	73	1
	12016	+25	-29	37	24	1		12016	+45	-26	50	97	1
	12016	+27	-27	37	73	6		12016	+48	-24	52	121	1
	12016	+27	-29	39	73	1		12016	+51	-25	54	436	4
	12016	+29	-27	38	16	3		12016	+55	-25	58	194	1
	12016	+30	-28	40	16	4		12024	+58	-24	61	388	1
	12016	+31	-26	38	48	2		12020	+59	-17	61	97	1
	12016	+32	-25	39	73	4		12028	+59	+22	62	73	1
	12016	+34	-24	39	121	4							
	12016	+34	-26	41	73	2		(10)	(136)	(-1)		4653	49
	12016	+36	-25	42	194	9							
	12016	+39	-24	45	48	3	17.719	12034	-71	-25	73	73	1
	12016	+42	-24	46	194	1	M-2	12033	-65	+35	70	48	1
	12016	+45	-23	49	12	2		12033	-57	+34	64	24	1
	12016	+50	-23	54	16	2		12030	-48	+15	51	388	3
	12028	+39	+24	46	12	2		12030	-46	+13	48	48	2
	12028	+42	+23	47	12	1		12030	-45	+14	47	73	2
	12028	+44	+22	49	61	4		12030	-41	+12	43	242	3
	12020	+44	-17	46	16	2		12030	-39	+14	42	727	7
	12014	+48	-11	49	12	1		12031	-46	-23	50	48	1

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U.T.	No.	Δl	φ	ρ	A	s	U.T.	No.	Δl	φ	ρ	A	s
		$^{\circ}$	$^{\circ}$	$^{\circ}$					$^{\circ}$	$^{\circ}$	$^{\circ}$		
	12031	-45	-22	49	24	1		12016	+80	-20	80	145	1
	12031	-45	-28	51	16	1		(8) (112) (-1)				3841	58
	12031	-45	-26	50	194	1							
	12035	-6	-15	15	12	1							
	12023	+5	-16	16	12	1	19,592	12040	-85	+16	85	727	2
	12032	+23	+22	33	48	2	N-3	12039	-82	-17	82	679	1
	12032	+26	+21	34	24	2		12039	-75	-16	75	291	1
	12016	+47	-29	54	48	1		12038	-66	+14	67	6	1
	12016	+49	-27	54	97	1		12038	-65	+15	66	6	1
	12016	+50	-25	54	16	1		12038	-64	+15	65	6	1
	12016	+52	-28	56	121	3		12034	-45	-25	49	24	1
	12016	+54	-28	59	73	2		12030	-26	+15	31	16	1
	12016	+55	-26	59	194	3		12030	-26	+16	31	12	1
	12016	+63	-24	64	727	7		12030	-25	+16	30	12	1
	12016	+69	-22	70	339	1		12030	-25	+17	31	48	1
	12016	+75	-22	76	48	1		12030	-23	+14	28	485	5
	12017	+48	+31	56	24	2		12030	-21	+13	25	73	1
	12017	+49	+29	56	97	3		12030	-17	+14	23	291	7
	12017	+51	+28	57	73	2		12030	-17	+12	22	97	3
	12017	+53	+28	59	16	2		12030	-16	+15	23	24	1
	12017	+59	+26	64	145	3		12030	-15	+13	20	388	1
	12028	+67	+21	70	24	1		12030	-15	+11	19	48	3
	12028	+70	+21	73	97	3		12030	-14	+15	22	12	2
	12020	+70	-16	70	24	1		12030	-12	+12	17	73	3
	(11) (123) (-1)				4164	67		12031	-24	-24	33	12	1
18,593	12034	-60	-25	63	48	1		12031	-24	-26	35	12	1
N-2	12033	-46	+34	55	16	1		12031	-20	-26	32	194	3
	12030	-37	+15	41	533	3		12035	+21	-14	24	12	1
	12030	-35	+15	38	73	4		12032	+46	+22	51	12	1
	12030	-32	+13	34	48	1		12017	+73	+30	77	97	1
	12030	-31	+13	34	48	1		12016	+76	-27	78	48	3
	12030	-30	+14	34	242	5		12016	+78	-25	79	48	1
	12030	-28	+16	33	121	3		12016	+85	-23	85	339	1
	12030	-27	+12	31	73	3		(10) (98) (-1)				4092	51
	12030	-26	+14	31	364	2							
	12030	-25	+12	28	73	4	20,603	12040	-80	+18	80	194	2
	12031	-36	-23	41	32	1	N-2	12040	-69	+17	71	727	1
	12031	-34	-25	41	194	1		12039	-67	-16	68	582	2
	12031	-34	-28	43	24	2		12039	-59	-15	61	291	1
	12023	+20	-12	23	16	1		12034	-33	-25	38	24	1
	12032	+35	+22	41	6	1		12030	-14	+16	23	48	2
	12032	+37	+22	44	16	1		12030	-13	+16	22	24	2
	12017	+59	+29	64	121	3		12030	-11	+14	19	73	4
	12017	+65	+27	69	48	1		12030	-8	+15	19	339	5
	12017	+68	+27	71	48	2		12030	-7	+14	18	97	4
	12016	+60	-25	63	73	1		12030	-5	+16	18	48	2
	12016	+65	-26	67	97	2		12030	-4	+14	17	267	3
	12016	+66	-26	68	73	2		12030	-2	+11	13	48	2
	12016	+68	-25	70	218	3		12030	-1	+14	16	388	1
	12016	+69	-24	71	73	1		12030	-1	+16	17	48	1
	12016	+74	-23	76	679	2		12030	+3	+12	14	121	2
	12016	+76	-22	77	242	4		12031	-9	-24	25	97	3
	12016	+80	-21	80	97	1		12031	-7	-25	25	170	1
								(5) (85) (-2)				3586	39

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U. T.	No.	Δl	φ	ρ	A	s	U. T.	No.	Δl	φ	ρ	A	s
		$^{\circ}$	$^{\circ}$	$^{\circ}$					$^{\circ}$	$^{\circ}$	$^{\circ}$		
21.754	12040	-70	+22	73	194	1		12030	+24	+15	29	24	1
N-1	12040	-65	+17	66	388	1		12030	+25	+14	30	339	2
	12040	-54	+16	56	533	2		12030	+25	+11	27	36	1
	12039	-54	-16	55	291	1		12030	+29	+13	33	36	1
	12039	-51	-17	53	339	1		12031	+15	-25	27	73	2
	12039	-42	-16	44	291	1		12031	+17	-26	30	109	1
	12042	-25	+14	29	48	1		(8)	(58)	(-2)		5064	55
	12042	-24	+12	27	48	1	23.677	12047	-80	+23	80	32	1
	12041	-23	-46	48	48	1	M-3	12046	-80	+33	81	32	2
	12034	-16	-24	27	16	1		12046	-79	+34	80	145	2
	12030	+4	+17	20	97	1		12046	-79	+35	80	388	2
	12030	+4	+13	15	97	1		12045	-73	-20	74	32	1
	12030	+6	+14	17	194	1		12040	-49	+22	54	97	1
	12030	+8	+15	19	242	2		12040	-48	+20	53	61	2
	12030	+12	+14	20	242	2		12040	-47	+22	52	145	5
	12030	+14	+14	22	242	2		12040	-46	+20	50	121	8
	12030	+19	+12	24	97	1		12040	-45	+15	48	97	1
	12031	+5	-25	24	73	1		12040	-45	+14	48	121	1
	12031	+6	-26	25	97	1		12040	-44	+15	47	36	1
	(7)	(70)	(-2)		3577	23		12040	-43	+14	46	12	1
22.697	12040	-61	+20	64	73	1		12040	-42	+19	46	16	2
M-1	12040	-61	+22	64	194	1		12040	-41	+16	44	12	2
	12040	-59	+14	62	242	2		12040	-39	+17	44	121	10
	12040	-58	+15	61	73	1		12040	-37	+17	42	97	6
	12040	-58	+20	62	97	3		12040	-35	+17	39	48	2
	12040	-56	+14	58	97	2		12040	-35	+18	40	48	3
	12040	-55	+16	58	73	1		12040	-31	+18	36	61	5
	12040	-54	+17	57	194	2		12040	-30	+15	35	48	3
	12040	-51	+17	54	97	1		12040	-28	+16	34	73	2
	12040	-49	+18	53	97	1		12040	-26	+16	32	533	1
	12040	-46	+17	50	48	1		12039	-30	-19	34	16	2
	12040	-45	+18	49	121	2		12039	-26	-17	30	727	9
	12040	-43	+17	46	73	1		12039	-17	-16	24	48	7
	12040	-40	+16	44	533	1		12039	-15	-15	20	291	1
	12039	-41	-17	43	873	2		12042	-3	+13	15	73	3
	12039	-36	-17	38	48	1		12042	-2	+13	15	97	5
	12039	-34	-16	36	97	2		12042	+2	+13	15	24	3
	12039	-33	-17	36	48	1		12042	+4	+14	17	145	4
	12039	-29	-16	33	242	1		12041	0	-47	46	24	5
	12042	-15	+12	20	61	1		12041	+3	-46	44	32	2
	12042	-14	+13	21	61	1		12041	+7	-44	43	24	4
	12042	-11	+12	17	24	1		12034	+5	-25	24	6	1
	12042	-9	+13	17	121	2		12044	+13	+33	36	16	1
	12041	-10	-47	46	73	1		12044	+15	+33	36	24	2
	12041	-6	-46	45	48	1		12030	+21	+13	25	6	1
	12041	-5	-45	44	24	1		12030	+23	+13	27	6	1
	12034	-5	-24	24	48	3		12030	+26	+13	30	12	4
	12044	+2	+34	35	61	1		12030	+28	+15	33	48	6
	12044	+4	+34	36	73	1		12030	+28	+13	32	73	2
	12030	+14	+17	24	97	2		12030	+29	+14	34	16	1
	12030	+16	+13	22	121	2		12030	+30	+14	34	73	2
	12030	+17	+13	23	145	1		12030	+31	+19	36	6	1
	12030	+19	+14	25	73	1		12030	+31	+15	35	12	2
	12030	+23	+14	27	97	1		12030	+33	+15	36	16	4

DECEMBER

U. T.	No.	Δl	φ	ρ	A	s	U. T.	No.	Δl	φ	ρ	A	s	
		$^{\circ}$	$^{\circ}$	$^{\circ}$					$^{\circ}$	$^{\circ}$	$^{\circ}$			
	12030	+35	+15	38	48	3		12031	+44	-26	48	61	1	
	12030	+36	+16	39	24	4		(10)	(32)	(-2)		3874	115	
	12030	+37	+15	41	364	2								
	12030	+38	+12	41	16	4		25.764	12050	-82	+24	82	145	1
	12030	+38	+16	42	24	3	N-2	12046	-47	+32	56	61	1	
	12031	+29	-25	36	32	4		12046	-47	+35	58	461	1	
	12031	+31	-26	37	85	2		12040	-21	+22	31	61	1	
	(11)	(45)	(-2)		4784	159		12040	-19	+23	31	48	3	
								12040	-19	+21	29	73	2	
24.657	12046	-78	+34	79	97	3		12040	-18	+17	26	24	2	
M-3	12046	-65	+35	70	630	2		12040	-17	+15	25	61	1	
	12040	-36	+22	42	61	2		12040	-16	+14	24	73	1	
	12040	-35	+20	40	145	15		12040	-14	+17	24	32	1	
	12040	-32	+15	36	73	3		12040	-10	+18	23	109	2	
	12040	-31	+14	34	97	1		12040	-7	+17	21	16	2	
	12040	-30	+20	36	12	3		12040	-5	+17	20	24	1	
	12040	-30	+15	34	12	3		12040	-4	+16	19	36	1	
	12040	-28	+18	34	12	1		12040	-4	+18	21	24	1	
	12040	-26	+17	33	73	3		12040	-3	+16	18	32	2	
	12040	-25	+16	31	48	5		12040	-1	+17	20	48	2	
	12040	-24	+18	32	12	2		12040	+2	+17	20	558	1	
	12040	-23	+17	30	12	2		12039	-3	-16	15	121	2	
	12040	-19	+16	27	12	1		12039	+2	-16	15	703	3	
	12040	-18	+17	26	48	2		12039	+12	-14	16	267	1	
	12040	-17	+16	25	24	2		12042	+27	+14	32	73	1	
	12040	-16	+15	24	16	3		12042	+35	+16	38	145	2	
	12040	-16	+16	24	32	2		12049	+37	-22	41	109	2	
	12040	-14	+16	23	436	1		12049	+39	-24	44	32	1	
	12039	-16	-17	23	145	2		12049	+43	-23	46	24	1	
	12039	-14	-17	22	485	10		12049	+45	-24	49	61	1	
	12039	-5	-16	16	16	1		12044	+46	+34	56	36	1	
	12039	-3	-15	14	242	1		12048	+50	-26	54	194	2	
	12042	+11	+12	17	16	1		12048	+53	-26	56	36	1	
	12042	+12	+13	18	73	4		12048	+53	-24	56	32	1	
	12042	+13	+14	20	6	1		12048	+55	-25	58	170	3	
	12042	+13	+12	18	16	2		12030	+60	+14	63	61	1	
	12042	+17	+14	24	121	4		12030	+61	+15	64	73	1	
	12041	+15	-46	46	48	2		12030	+69	+15	71	339	1	
	12041	+21	-45	46	24	2		12031	+61	-26	64	48	1	
	12049	+23	-23	30	24	3		(10)	(17)	(-2)		4410	52	
	12049	+26	-24	34	16	1								
	12044	+31	+33	45	32	2								
	12048	+36	-26	42	16	2		26.748	12050	-66	+25	69	97	1
	12048	+37	-25	43	16	1		N-2	12046	-35	+33	47	24	1
	12030	+42	+13	44	24	1			12046	-34	+35	49	485	2
	12030	+43	+16	47	16	1			12040	-7	+22	25	48	2
	12030	+44	+14	47	48	3			12040	-7	+21	23	109	3
	12030	+44	+13	46	48	2			12040	-6	+18	22	24	2
	12030	+45	+14	48	73	2			12040	-6	+12	15	16	3
	12030	+46	+15	49	24	2			12040	-4	+16	18	48	1
	12030	+50	+14	53	16	1			12040	-4	+14	16	73	1
	12030	+50	+13	52	12	1			12040	-3	+16	18	32	2
	12030	+52	+16	55	16	1			12040	+2	+17	20	61	3
	12030	+53	+14	55	364	3			12040	+5	+17	20	145	4
	12031	+43	-25	46	24	2			12040	+13	+17	24	32	1

DECEMBER

U.T.	No.	Δl	φ	ρ	A	s	U.T.	No.	Δl	φ	ρ	A	s
		$^{\circ}$	$^{\circ}$	$^{\circ}$					$^{\circ}$	$^{\circ}$	$^{\circ}$		
	12040	+15	+16	24	606	6		12048	+76	-25	77	36	1
	12039	+11	-15	16	170	4		(11)	(351)	(-3)		5072	60
	12039	+12	-18	20	48	3							
	12039	+13	-16	19	61	1							
	12039	+14	-16	20	412	4	28.767	12054	-74	+22	76	194	6
	12039	+16	-16	22	194	2	M-1	12054	-62	+20	65	339	3
	12039	+25	-14	27	388	1		12054	-58	+17	61	24	1
	12042	+42	+14	45	73	1		12054	-57	+18	61	24	2
	12042	+48	+14	51	170	1		12051	-56	-22	58	170	2
	12049	+49	-22	53	145	3		12051	-53	-22	55	48	2
	12049	+50	-23	53	48	1		12051	-50	-21	52	218	1
	12049	+51	-24	54	61	1		12053	-46	+17	50	48	3
	12049	+55	-23	57	109	2		12053	-41	+16	44	32	1
	12048	+59	-27	63	73	1		12059	-40	+29	50	48	1
	12048	+60	-26	63	242	4		12059	-40	+31	51	97	1
	12048	+62	-28	65	436	3		12059	-37	+29	48	32	1
	12048	+62	-25	64	97	1		12059	-34	+29	46	32	1
	12048	+65	-26	66	339	3		12050	-39	+24	46	73	1
	12048	+65	-24	66	73	1		12058	-19	-16	24	12	1
	12048	+66	-25	67	218	1		12058	-17	-14	21	12	2
	12031	+71	-25	73	61	1		12046	-16	+35	41	32	1
	12030	+80	+14	80	485	1		12046	-15	+34	39	16	1
	(9)	(4)	(-2)		5703	72		12046	-9	+34	37	388	1
27.724	12054	-85	+21	85	485	1		12056	-7	+47	51	12	1
N-4	12054	-78	+18	78	48	1		12056	-3	+47	51	12	1
	12051	-70	-21	71	97	1		12040	+19	+19	31	12	2
	12051	-69	-20	70	36	1		12040	+20	+17	29	16	2
	12051	-68	-21	69	97	1		12040	+21	+16	28	6	2
	12051	-66	-21	67	242	2		12040	+22	+13	27	73	1
	12053	-57	+16	60	16	1		12040	+31	+16	36	36	2
	12050	-54	+25	60	97	1		12040	+40	+15	44	436	1
	12046	-34	+34	49	48	2		12040	+41	+17	45	16	1
	12046	-26	+35	45	16	1		12039	+36	-16	38	121	2
	12046	-23	+32	40	36	1		12039	+37	-17	39	48	1
	12046	-22	+36	44	582	1		12039	+38	-17	41	24	1
	12052	-6	-20	17	24	2		12039	+38	-22	42	36	1
	12040	+6	+20	24	73	5		12039	+40	-18	43	194	1
	12040	+8	+13	17	97	1		12039	+42	-19	44	24	1
	12040	+8	+16	21	48	3		12039	+43	-18	45	24	3
	12040	+17	+17	22	97	4		12039	+44	-18	45	32	1
	12040	+26	+16	33	485	3		12039	+51	-15	52	242	1
	12039	+23	-16	26	194	1		12049	+74	-24	76	48	1
	12039	+24	-17	28	48	2		12049	+79	-23	79	73	1
	12039	+24	-19	29	73	1		12049	+85	-24	85	97	1
	12039	+26	-18	30	388	5		(11)	(338)	(-3)		3421	60
	12039	+27	-19	32	61	1	29.758	12061	-70	+27	74	36	1
	12039	+30	-18	34	73	2	M-3	12061	-60	+22	64	194	6
	12039	+37	-15	39	315	1		12061	-58	+23	63	24	4
	12049	+59	-23	62	121	1		12061	-55	+22	60	24	1
	12049	+70	-27	72	48	1		12061	-54	+21	58	121	3
	12042	+61	+14	64	121	1		12061	-52	+20	56	73	3
	12048	+74	-26	76	970	11		12062	-70	-24	71	12	1
								12060	-58	-36	64	24	3

DECEMBER

U. T.	No.	Δl	φ	ρ	A	s	U. T.	No.	Δl	φ	ρ	A	s
	12060	-51	-36	58	24	4		12051	-33	-21	36	145	1
	12054	-48	+18	52	145	3		12051	-25	-21	30	121	1
	12054	-47	+20	52	194	1		12059	-20	+31	38	32	1
	12053	-45	+16	48	24	1		12059	-16	+30	36	73	2
	12053	-43	+17	46	16	1		12059	-15	+29	35	36	1
	12053	-43	+18	46	24	1		12059	-13	+28	34	48	1
	12053	-32	+17	37	16	1		12059	-9	+27	32	61	1
	12053	-31	+18	37	6	1		12050	-15	+24	31	73	1
	12051	-44	-22	46	145	1		12058	+2	-12	9	24	2
	12051	-40	-21	43	12	1		12046	+1	+36	38	24	1
	12051	-36	-22	39	194	5		12046	+6	+35	38	24	1
	12059	-28	+30	43	16	1		12046	+14	+35	41	630	1
	12059	-27	+31	43	97	2		12040	+47	+13	50	109	1
	12059	-26	+29	41	36	2		12040	+63	+18	66	121	1
	12059	-25	+29	41	24	1		12040	+66	+16	67	630	1
	12059	-25	+30	41	24	3		12039	+64	-16	65	97	1
	12059	-21	+28	36	48	1		12039	+66	-18	66	242	1
	12050	-26	+24	37	73	1		12039	+79	-15	79	436	1
	12058	-11	-13	14	6	1			(8)	(313)	(-3)	3809	31
	12058	-10	-12	14	16	2							
	12058	-9	-13	14	16	2							
	12057	-1	+20	23	12	1							
	12057	+2	+21	24	12	4							
	12046	+1	+35	37	364	2	31.639	12064	-82	-21	82	339	2
	12055	+8	-19	18	16	6	N-1	12063	-64	-16	65	61	1
	12055	+10	-18	18	6	1		12054	-36	+22	43	267	5
	12040	+33	+18	39	48	5		12054	-30	+21	38	315	5
	12040	+35	+13	38	48	1		12054	-25	+19	34	145	2
	12040	+45	+16	49	16	3		12054	-24	+21	34	533	3
	12040	+50	+15	53	16	5		12054	-23	+18	32	48	1
	12040	+54	+15	57	436	1		12054	-21	+17	29	24	1
	12039	+51	-16	53	97	2		12054	-17	+19	28	12	1
	12039	+51	-17	53	73	7		12051	-19	-21	26	170	1
	12039	+53	-16	54	12	1		12051	-12	-21	22	73	2
	12039	+54	-21	56	12	1		12059	-8	+33	36	16	1
	12039	+54	-17	55	97	8		12059	-6	+32	35	24	1
	12039	+59	-17	61	36	1		12059	-2	+31	33	97	2
	12039	+65	-15	66	218	1		12059	+1	+29	33	97	2
		(14)	(325)	(-3)	3183	108		12059	+3	+29	33	16	1
								12050	-3	+16	19	61	1
								12046	+13	+36	41	61	1
								12046	+18	+35	42	36	1
								12046	+25	+36	45	606	1
								12058	+17	-11	19	73	3
								12057	+27	+23	37	36	1
								12039	+74	-15	75	97	1
								12040	+80	+17	80	630	1
									(11)	(300)	(-3)	3837	41
30.671	12054	-48	+21	53	315	4							
N-1	12054	-43	+21	48	48	1							
	12054	-42	+19	46	121	1							
	12054	-38	+20	44	121	1							
	12054	-36	+20	43	242	3							
	12054	-34	+16	38	36	1							

Mean for 31 days, $A=4102$, $r=183.3$